November 2001

Coquille River and Boat Basin
Sediment Quality Evaluation

ABSTRACT

This evaluation was conducted following procedures set forth in the Inland Testing Manual and the Ocean Disposal Testing Manual (Green Book), developed jointly by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency to assess dredged material. Guidelines used are those developed to implement the Clean Water Act and the Marine Protection, Research and Sanctuary Act. These guidelines and associated screening levels are those adopted for use in the Dredge Material Evaluation Framework for the Lower Columbia River Management Area, November 1998.

A total of six (6) sediment samples were collected from the Coquille River Federal channel and boat basin entrance channel on August 21, 2001. All samples were submitted for physical analyses including total volatile solids. Two (2) sediment samples were analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons and organotin.

The level for silver in sample COQR-P-05 was initially found to be above the SL; reanalysis of the sample found the level to be substantially below the SL. None of the other contaminants tested were found to be at or above their SL. Therefore, all sediment is determined to be suitable for unconfined, in-water placement without further characterization.

INTRODUCTION

This report characterizes the sediment to be dredged at Coquille River Federal channel and boat basin entrance channel for the purposes of dredging and disposal. The sampling and analysis objectives are stated in the Sampling and Analysis Plan (SAP August 2001), and are also listed below. This report will outline the procedures used to accomplish these objectives.

Sampling and Analysis Objectives

- Characterize sediments in accordance with the regional dredge material testing manual, the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF; to be expanded to include all of Oregon).

- Collect, handle and analyze representative sediment of the purposed dredging prism, in accordance with protocols and Quality Assurance/Quality Control (QA/QC) requirements.

- Characterize sediments to be dredged for evaluation of suitability of inwater disposal.

- Conduct physical and chemical characterization only for this sediment evaluation, unless DMEF screening levels are exceeded and further characterization (Tier III Biological Assays) is needed to determine disposal method.

PREVIOUS STUDIES

The U.S. Army Corps of Engineers (Corps), Portland District, routinely evaluates sediment from its projects on a 5-year rotation. Physical evaluation sampling was performed at the Coquille River starting in 1979 and continued in 1981, 1982, 1990 and 1996. Chemical analyses were also conducted as part of the 1996 sampling event; additional samples were collected in the boat basin as part of an U.S. Environmental Protection Agency (EPA) funded study. The results of these studies revealed the sediment, especially in Federal channel areas, to be predominately medium-grained sands with a low organic content. Sediments in the boat basin were primarily silt, with fine-grained sand and clay. Sediments from the previous studies have been found suitable for unconfined, in-water placement.

CURRENT SAMPLING EVENT/DISCUSSION

A total of six (6) sediment samples were collected from the Coquille River Federal channel and boat basin entrance channel on August 21, 2001 (see Table 1 and Figure 1). The samples were collected using a Ponar sampling device. All samples were submitted for physical analyses including total volatile solids (TVS). Two (2) sediment samples were analyzed for metals (9 inorganic), total organic carbon (TOC), pesticides and polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs) and organotin (TBT).

Table 1. Sample Location Coordinates

COQR-P-01	43º 07’ 25.56”	COQR-P-04	43º 07’ 30.84”
	124º 25’ 41.76”		124º 24’ 29.88”
COQR-P-02	43º 07’ 21.36”	COQR-P-05	43º 07’ 15.72”
	124º 25’ 27.24”		124º 24’ 39.24”
COQR-P-03	43º 07’ 18.84”	COQR-P-06	43º 07’ 14.46”
	124º 24’ 42.60”		124º 24’ 39.54”

RESULTS

Physical and Volatile Solids (ASTM methods). All six (6) samples were submitted for physical and TVS analyses and the data are presented in Table 1. Two (2) samples exceeded 20% fines and/or 5% volatile solids. One of these samples was classified as

"elastic silt with sand" and the other sample as "silt with sand." Both the samples were black in color. The remaining four (4) samples submitted did not exceeded 20% fines and/or 5% volatile solids and were classified as "poorly graded sand."

Mean grain size for all the samples is 0.39 mm, with 1.09% gravel, 72.99% sand and 25.92% fines. Volatile solids for all the samples ranged from 0.59% to 10.07%.

Metals (EPA method 6020/7471), Total Organic Carbon (EPA method 9060). Two (2) samples were submitted for testing and the data are presented in Table 2. Low levels of most metals were found in the samples and most did not approach the screening level (SL), except for nickel and silver. Levels for nickel in the samples were found to be 85.7% and 92.8% of the SL. In one sample, the level for silver was found to exceed the SL; this sample was reanalyzed and the level was found to be 0.2 mg/kg, which is substantially below the SL (duplicate was 0.22 mg/kg). The TOC ranged from 26,000 to 27,000 mg/kg in the samples.

Organotin (TBT; pore water method). Two (2) samples were tested and the data are presented in Table 3. Organotin was not detected at the method detection limit (MDL) in the samples.

Pesticides/PCBs (EPA method 8081A/8082), Phenols, Phthalates and Miscellaneous Extractables (EPA method 8270). Two (2) samples were tested and the data are presented in Table 4. No PCBs or pesticides (including DDT) were found at the MDL. Total DDT and its breakdown products, DDD and DDE, were not detected above the MDL. The compound phenol was detected in one sample at 2.6% of the SL. Four (4) phthalates were detected and all were well below the SL (<3%). Benzoic acid was found to be below the MDL in both samples, and dibenzofuran was found in one sample at 3.1% of the SL.

Polynuclear Aromatic Hydrocarbons (EPA method 8270C). Two (2) samples were tested and the data are presented in Tables 4 and 5. Low levels of some individual "low molecular weight" PAHs were found in one sample at levels ranging from 5% to 9% of the SL. The highest was phenanthrene at 9% of the SL. Low levels of most "high molecular weight" PAHs were found in both samples and ranged from 0.5% to 7.0% of the SL. The highest was fluoranthene at 7% of the SL.

CONCLUSION

Collection and evaluation of the sediment data was completed using guidelines from the Dredge Material Evaluation Framework for the Lower Columbia River Management Area (DMEF). The DMEF is a regional manual developed jointly with regional EPA, Corps, Oregon Department of Environmental Quality and Washington Departments of Ecology and Natural Resources. This document is a guideline for implementing the Clean Water Act (40 CFR 230), Section 404 (b)(1), and for the Marine Protection, Research and Sanctuary Act (MPRSA). The screening levels used are those adopted for use in the DMEF, final November 1998. The DMEF tiered testing approach requires that material in excess of 20% fines and greater than 5% volatile solids, as well as any material with prior

history or is suspected ("reason to believe") of being contaminated, be subjected to chemical as well as physical analyses.

A total of six (6) sediment samples were collected from the Coquille River Federal channel and the boat basin entrance channel on August 21, 2001. Physical analyses were run on each sample. Two (2) samples were submitted for chemical analyses. The level for silver in sample COQR-P-05 was initially found to be above the SL; reanalysis of the sample for silver found the level to be substantially below the SL. None of the other contaminants tested were found to be at or above their SL. Therefore, all sediment is determined to be suitable for unconfined, in-water placement without further characterization.

REFERENCES

1. U.S. Army Corps of Engineers, Portland District and Seattle District; U.S. Environmental Protection Agency, Region 10; Oregon Department of Environmental Quality; Washington State Department of Natural Resources and Department of Ecology. 1998 Final. Dredge Material Evaluation Framework for the Lower Columbia River Management Area.

2. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. February 1998. Evaluation of Dredged Material Proposed for Discharge in Inland and Near Coastal Waters - Testing Manual (referred to as the "Inland Testing Manual").

3. Clean Water Act, 40 CFR 230 (b)(1).

4. U.S. Army Corps of Engineers. August 2001. Sediment Sampling and Analysis Plan, Coquille River Channel and Boat Basin Entrance. Portland District.

5. U.S. Army Corps of Engineers. 1996. Coquille River Sediment Evaluation, 1996. Portland District.

Table 1. Coquille River and Boat Basin **Sampled August 21, 2001**

Physical Analysis & Volatile Solids

Sample I.D.	Grain Size (mm)		Percent			
	Median	Mean	Gravel	Sand	Silt/Clay	Volatile Solids
COQR-P-01	1.85	1.2479	3.95	94.69	1.36	0.59
COQR-P-02	0.20	0.4758	2.57	95.37	2.06	0.88
COQR-P-03	0.26	0.1978	0.00	99.58	0.42	1.23
COQR-P-04	0.31	0.3440	0.00	99.53	0.47	1.78
COQR-P-05	0.042	0.0413	0.00	29.17	70.83	10.07
COQR-P-06	0.040	0.0347	0.00	19.61	80.39	9.19
Mean	0.45	0.39	1.09	72.99	25.92	3.96
Minimum	0.20	0.0347	0.00	19.61	0.42	0.59
Maximum	1.85	1.2479	3.95	99.58	80.39	10.07

Table 2. Coquille River and Boat Basin **Sampled August 21, 2001**

Inorganic Metals and TOC

Sample I.D.	As	Sb	Cd	Cu	Pb	Hg	Ni	Ag	Zn	TOC
	mg/kg (ppm)									
COQR-P-05	6.4 B1	<0.055	0.96 J	35	8	<0.073	120	**6.6***	90	27000
COQR-P-06	4 B1	0.91 J	0.91 J	58	8.7	<0.055	130	<4.6	89 B2	26000
Screening level (SL)	57	150	5.1	390	450	0.41	140	6.1	410	

***** Silver (Ag) for COQR-P-05 was reanalyzed on 10/24/01; the result = 0.2 mg/kg (duplicate = 0.22 mg/kg).

J = Estimated value (reported values are above the MDL, but below the PQL).
B1 = Low-level contamination was present in the method blank (reported level was < 10 times blank concentration).
B2 = Low-level contamination was present in the method blank (reported level was > 10 times blank concentration).
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).

Table 3. Coquille River and Boat Basin **Sampled August 21, 2001**

Organotin

Interstitial (Pore) Water

Sample I.D.	Tetrabutyltin	Tributyltin	Dibutyltin	Monobutyltin	Total TBT
	ug/L (ppb)				
COQR-P-05	<0.002	<0.0028	<0.002	<0.0019	ND
COQR-P-06	<0.0022	<0.0032	<0.0022	<0.0021	ND
Screening level (SL)	+	+	+	+	0.15

TBT = Total organotin (interstitial water).
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).

Table 4. Coquille River and Boat Basin **Sampled August 21, 2001**

Pesticides, PCBs*, Phenols, Phthalates and Extractables

Sample I.D.	Pesticides				Phenols		Phthalates					Extractables	
	ug/kg (ppb)												
	4,4'-DDD	4,4'-DDE	4,4'-DDT	Total DDT	Phenol	3- & 4-Methyl-phenol	Di-n-octyl-phthalate	bis(2-Ethylhexyl) phthalate	Butylbenzyl-phthalate	Dimethyl-phthalate	Diethyl-phthalate	Benzoic Acid	Dibenzo-furan
COQR-P-05	<0.53	<0.63	<0.71	ND	11 J	130	<9.1	46 J	28 J	<3.8	6.3 J	<12	17 J
COQR-P-06	<0.5	<0.59	<0.66	ND	<6.6	170	<8.6	57 J	16 J	5.6 J	5.9 J	<11	<3.8
Screen level (SL)	DDD + DDE + DDT = 6.9				420	670	6200	8300	970	1400	1200	650	540

*** No PCBs** were found in any sample at the MDL (SL = 130 ppb).

J = Estimated value (reported values are above the MDL, but below the PQL).

Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)

Table 5. Coquille River and Boat Basin **Sampled August 21, 2001**

Polynuclear Aromatic Hydrocarbons (PAHs)

Low Molecular Weight Analytes

ug/kg (ppb)

Sample I.D.	Acenapththene	Acenaphthylene	Anthracene	Fluorene	2-Methyl naphthalene	Naphthalene	Phen-anthrene	Total Low PAHs
COQR-P-05	25	<1.5	51	35	13	<1.6	140	264
COQR-P-06	<1.6	<1.4	<0.83	<1.5	<0.51	<1.5	10	10
Screen level (SL)	500	560	960	540	670	2100	1500	5200
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit)								

Table 6. Coquille River and Boat Basin **Sampled August 21, 2001**

Polynuclear Aromatic Hydrocarbons (PAHs)

High Molecular Weight Analytes

ug/kg (ppb)

Sample I.D.	Benzo(a)-anthracene	Benzo(b)-fluro-anthene	Benzo(k)-fluro-anthene	Benzo-(g,h,i)-perylene	Chrysene	Pyrene	Benzo(a)-pyrene	Dibenz(a,h)-anthracene	Indeno-(1,2,3-cd)-pyrene	Fluor-anthene	Total High PAHs
COQR-P-05	36	20	9.1	<0.58	93	56	10	<0.82	<0.82	120	344.1
COQR-P-06	4 J	8.9	5.9	<0.54	10	16	6.3	<0.77	<0.77	42	93.1
Screen level (SL)	1300	b + k = 3200		670	1400	2600	1600	230	600	1700	12000

J = Estimated value (reported values are above the MDL, but below the PQL).
Symbol (<) = Non-detect (ND) at the value listed (Method Detection Limit).

Figure 1. Coquille River and Boat Basin Sampling Locations